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25 September 1987

Nutritional Medicine Service

Aircrew Nutrition

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This diet instruction has been given to you by _____,
(Name)

at _____,
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on _____.
(Date)

If questions arise, direct them to the health care provider at _____.
(Telephone number)

DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington DC 20330-5000

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Nutritional Medicine Service

AIRCREW NUTRITION

This pamphlet provides guidance needed by the aircrew members to follow a nutritious diet. It also provides instructions to meet the nutritional needs of each individual within the restrictions imposed by the flight environment. The use of names of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

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Definitions

Alcohol — A substance found in distilled spirits, beer, and wine.

Appropriate Weight — The weight at which a person is the healthiest. This weight should give the best life expectancy.

Calorie — The energy that comes into the body in the form of food. Calories are provided by protein, carbohydrate, fat, and alcohol.

Sources of Energy (calories)

Protein	4 calories per gram
Carbohydrate	4 calories per gram
Fat	9 calories per gram
Alcohol	7 calories per gram

Carbohydrates — Starches and sugars that provide the body with a readily available source of energy.

Dehydration — An abnormal depletion of body fluids.

Diuretic — A substance causing an increase in urine production, therefore, potentially contributing to dehydration. Examples include certain drugs, alcohol, and caffeine.

Fats — Fats provide the most concentrated source of energy and are found in all animal products, such as butter and cream, as well as in oil, margarine, nuts, and olives.

Nutrient — Chemical substances obtained from food during digestion. They are needed to build and maintain body cells, regulate body processes, and supply energy. Essential nutrients are carbohydrates, proteins, fats, vitamins, minerals, and water.

Obesity — When the body weight is about 20 percent or more above the appropriate weight. When the body is 10 percent above the appropriate weight, an individual is considered to be overweight.

Proteins — Proteins makeup the basic structure of all living cells. Their primary function is the growth and maintenance of tissue. Good sources include meat, fish, poultry, milk, cheese, and eggs.

Introduction

As an aircrew member, you may be faced with numerous environmental stresses of flight. Some of these stresses are decompression sickness, temperature extremes, visual limitations, accelerative forces, reduced barometric pressure, lowered oxygen pressure, and hyperventilation. These are examples of stresses over which you have little control and that are the result of exposure to the flight environment. There are other self-imposed stresses, however, that also directly influence your physical performance in flight. These may increase your susceptibility to unavoidable stresses. Examples of self-imposed stresses include: psychological stress, drugs and over-the-counter medications, smoking, fatigue, and improper nutrition.

Being aware of and applying those principles of basic nutrition, and observing special nutritional considerations, with respect to flight, will help you to attain a greater degree of sustained, exacting performance. Comprehensive studies and research have shown that improper or irregular eating habits over an extended period of time contribute to fatigue, lack of proper attitude, human error, and possible aircraft accidents.

Basic Nutrition

The Prudent Diet

When there are 1,000 different food items on the supermarket shelves, it can be difficult to select a healthy diet. How can you be sure that what you choose is the best?

To help you, nutrition scientists have designed an easy-to-use guide that sorts food into four groups: milk, meat (and other protein foods), fruit and vegetables, and grain. Foods in each group have a similar nutrient content. A fifth group that has been added recently includes condiments, fats, and carbohydrates, such as sugar, candy, and desserts. These foods complement, but do not replace foods from the basic four food groups. Amounts consumed should be determined by individual caloric needs. Remember that no single food can provide all the necessary nutrients in the correct amounts for good health. If you use the guide below daily, you can eat a variety of foods that will supply all the nutrients you need. Larger servings are determined by individual caloric needs.

Adult Minimum Servings Per Day	Food Group	"Prudent Diet" Recommendations
2	Milk— 1 cup skim milk, plain, low-fat yogurt 1½ oz. low-fat cheese*	1. Use skim milk and low-fat yogurt rather than whole milk and regular yogurt. 2. Use skim milk cheeses such as: Jarlsberg, mozzarella, or neufchatel.

*Count cheese or cottage cheese as a serving of either milk *or* meat, but not both during the same meal.

The Prudent Diet (cont'd)

Adult Minimum Servings Per Day	Food Group	"Prudent Diet" Recommendations
	1 cup pudding 2 cups low-fat cottage cheese*	3. Use skim milk when making pudding. 4. Use low-fat cottage cheese instead of creamed.
2	Meat— 2 oz. cooked, lean poultry, or fish	1. Use lean cuts of meat and trim off any extra fat. 2. Choose poultry, veal, and fish more often than beef, pork, and lamb. 3. Bake, broil, roast, stew, or boil your meats and discard the drippings and poultry skin. 4. Restrict the use of luncheon rolls, "variety meats," and canned or cured meats, such as sausage, frankfurters, salt pork, and bacon. 5. Limit organ meats and shrimp.
	Protein Equivalent: 2 eggs (high cholesterol) 2 oz. low-fat cheese* 1 cup dried beans or peas 4 tbsp. peanut butter ½ cup low-fat cottage cheese*	6. Limit the number of egg yolks to three per week, including those used in cooking. Egg whites or commercial egg substitute products may be used without restriction. 7. Nuts and legumes (beans and peas) may be used as an alternate protein source. Peanut butter is a useful choice. However, some nuts are high in saturated fat, such as cashews and macademia nuts, and should be avoided. 8. Use low-fat rather than creamed cottage cheese.

*Count cheese or cottage cheese as a serving of either milk *or* meat, but not both during the same meal.

The Prudent Diet (cont'd)

Adult Minimum Servings Per Day	Food Group	"Prudent Diet" Recommendations
4	Fruit-Vegetable ½ cup cooked ½ cup juice 1 cup raw Portion commonly served such as a medium apple or banana	1. Use fruits for desserts and snacks. 2. Raw vegetable pieces can be used as party foods and between meal snacks. 3. Increase the amounts of fruits and vegetables as you decrease the amount of meat in your diet.
4	Grain— Whole-grain, fortified enriched products ½ slice bread ½ cup cooked cereal, pasta, grits 1 cup ready-to-eat cereal	1. Use plain breads and rolls in place of hot breads, pancakes, waffles, pastries and doughnuts. 2. Encourage the use of whole grain breads and cereals. 3. Use the grain products to provide calories and bulk to your diet as you decrease the amount of meat and fat.
Limit use to maintain your weight	Other— This group includes fats and oils, sugars, sweets, and desserts.	1. Use liquid vegetable oils and vegetable oil margarines in place of solid shortening, butter, lard, and regular margarine. 2. Substitute gelatin, fruit, skim milk puddings, sherbert, fruit ices, angel food cake instead of rich cakes and pastries. 3. Reduce the amount of salt used in cooking and at the table. Limit the amount of salty snack foods you consume such as potato chips, pretzels, and crackers. 4. Avoid chocolate and coconut—they are high in saturated fat. 5. Avoid gravies and sauces made from meat drippings, use fat-free broth or bouillon as gravy or sauce bases.

Weight Control

Although you need the same nutrients throughout your life, you may need different amounts at different times. When you overeat (that is, take in more calories than you use in daily activity), you store excess calories as fat. To find your appropriate weight, use the following table:

Rule of 5's and 6's

Women	Men
Allow 100 pounds for the first 5 feet of height. Add 5 pounds for each inch over 5 feet.	Allow 106 pounds for the first 5 feet of height. Add 6 pounds for each inch over 5 feet.

This is only a "rule of thumb" for determining your weight for your height. Your flight surgeon will further advise you on the most appropriate or desirable weight for you, as an individual.

The amount of calories you need depends on your body size, age, stage of growth, state of health, and physical activity level. Use the following table to determine your calorie needs:

Basal (Resting) Calories	Activity Calories	Daily Caloric Requirements
10 calories per pound of appropriate weight +	Sedentary (30 percent basal) = Moderate (50 percent basal) Strenuous (100 percent basal)	Total Daily Calories to Maintain Weight

Example 1. A 70-inch sedentary male.
Weight—106 pounds for the first 60 inches, plus 60 pounds
Basal (resting) calories—166 pounds by 10 = 1660 calories
Activity calories—30 percent by 1660 = 498 calories
Total calories to maintain weight—1660 + 498 = 2158 calories.

Example 2. A 65-inch sedentary female.
Weight—100 pounds for the first 60 inches, plus 25 pounds
Basal (resting) calories—125 pounds by 10 = 1250 calories
Activity calories—30 percent by 1250 = 375 calories
Total calories to maintain weight—1250 + 375 = 1625 calories

Weight watchers need the same basic foods. You can cut calories by substituting skim or buttermilk for whole milk, and skim milk cheese for whole milk cheese; by using only meat trimmed of fat; by broiling and roasting instead of frying meats; by preparing vegetables without butter or cream sauce, and fruits without sugar; and by avoiding sweets.

Whether you are controlling your weight or trying to lose weight, these points should be considered:

1. The diet should be based upon the basic four food groups and sound nutrition principles.

2. The diet should include carbohydrate, protein, and fat, and should not overemphasize one particular nutrient or food.

3. Diets that contain extraordinary claims, such as promising large weight losses in a short period of time, should be avoided.

4. Diets that allow no modifications by the dieter do not promote a change in eating habits.

5. You should check with your flight surgeon before starting a diet.

6. If dieting to lose weight, 1 to 2 pounds per week is the optimum healthful rate of weight loss.

7. The most effective way to lose weight is to combine an exercise program with a nutritionally sound, calorie restricted diet.

8. Any medication that claims to be a diet aid or appetite suppressant should not be used. Such medications are found to be unnecessary in a weight reduction program and may seriously compromise your physical condition.

For further information on weight control, your flight surgeon can refer you to a certified health care provider who can furnish you with AFPs 166–26, Calorie Restricted Diets for Weight Reduction; and 166–27, Behavior Modification Related to Food.

Food Fads and Fallacies

Good dietary habits are often a matter of individual responsibility. Aircrew members should be aware of food fads and fallacies and not fall prey to nutritionally unsound practices or beliefs. Some of the most popular fad diets are listed below:

1. Restricted food choice diets (for example, boiled eggs and tuna fish) are boring and cause dieters to soon lose interest and motivation. Furthermore, eating only two or three specific foods does not allow you to select from all the food groups, as recommended in the Prudent Diet.

2. Grapefruit diets do nothing special to fat. One-half cup of grapefruit juice has about 40 calories, just like many other unsweetened juices, and does not help burn fat.

3. Low carbohydrate diets are likely to produce fatigue, dehydration, and in some cases, nausea and vomiting in persons who attempt to remain physically active. These diets are usually high in saturated fats and cholesterol-rich foods. They may result in elevated cholesterol and triglyceride levels in the blood, which are associated with an increased risk of developing coronary heart disease.

4. Low calorie diets (less than 600 calories per day) may be hazardous. Although the current "balanced-nutrition," very low calorie diets have proven to be much safer than the liquid-protein diets of the mid-1970's, they are not free of significant side effects. Aircrew members on such diets may experience nausea, diarrhea, headache, fatigue, irritability, and mild depression. None of these diets is totally protein-sparing and

their use can result in loss of lean body mass. Although less common, myocardial damage, and cardiac dysrhythmia may occur.

5. Herbal preparations, although considered food items may, in fact, contain potent pharmaceutical agents. Currently marketed preparations contain active diuretics, laxatives, and even cardiac glycosides (including foxglove). Some have ingredients with anticholinergic activity and sedative and hypnotic properties. The Food and Drug Administration (FDA) has documented adverse reactions to these products and condemned a few ingredients as unsafe for food use.

6. Human Chorionic Gonadotropin weight loss regimens, prolonged sauna baths, use of diuretics or cathartics, intentional dehydration by decreased fluid intake, induced vomiting, wear of impermeable sweat suits or any other extraordinary weight loss measures are hazardous and should be avoided.

Many fallacies exist about the food we eat; some of the most frequently heard are:

FALLACY: Bread and potatoes are fattening.

FACT: All foods have calories, and it is the total intake of calories and the amount of related activity that combine to make an effective weight loss or weight control program.

FALLACY: You need to take protein supplements when exercising strenuously.

FACT: As you increase food intake to meet the caloric demands of exercise, you will probably meet your protein needs from eating a balanced diet. A 154-pound person needs about 70 to 105 grams of dietary protein daily to meet strenuous exercise needs. The small servings of foods shown in the prudent diet provide about 56 grams; it assumes only 4 oz. (¼ pound) of meat, 4 servings of bread, 2 servings of vegetables, and 16 ounces of milk consumption daily. Four more oz. of meat would bring the total to 84 grams; add an 8 oz. glass of milk and you'll have 92 grams of protein.

FALLACY: The normal diet is inadequate in many essential nutrients.

FACT: If a variety of foods are chosen, using the basic four food groups as a guide, the normal diet will supply adequate vitamins and minerals. A possible exception is the amount of iron required by females of childbearing age. Supplementation should be at the suggestion of a physician.

FALLACY: All diseases are caused by a bad diet.

FACT: At this time, there is no scientific evidence that supports the belief that diet causes disease. A dietary component, such as cholesterol, can be a risk factor in a disease process, but no direct cause and effect relationship has been established with diet and disease.

FALLACY: Poor quality soil causes malnutrition.

FACT: The quality of the soil influences the quantity of the crop more than the nutritive value. While slight variations in the nutritive value of crops can be related to the soil, experiments have shown that the nutritive value of a given crop is influenced more by its genetic makeup than by the fertility of the soil. Crops grown on seriously depleted soil will be poor in quality—shriveled, blemished, small, and discolored.

It is important to be able to recognize food misinformation and not be influenced by the faddist or pseudoscientist. Knowing the facts about food and nutrition can save your health. Don't be fooled by food fads and fallacies.

Special Nutritional Considerations

Expansion of Intestinal Gas

At sea level, the earth's atmosphere exerts a standard pressure. The weight and volume of atmospheric gases decrease at higher altitudes. Likewise, in flight, the gas in your body expands in proportion to the decreased pressure of the surrounding atmosphere. This expansion of gases may cause an uncomfortable feeling of fullness and, in some cases, painful cramps. Although most military aircraft are pressurized, the loss of pressurization is one of the most frequently reported flying mishaps. Therefore, you should follow certain dietary recommendations when flying and when preparing for altitude chamber flights conducted as part of physiological training. Those recommendations listed below are provided to help prevent the formation of gastrointestinal gas caused by swallowed air and gas-forming foods:

1. Avoid swallowing air.

2. Do not use drugs such as sodium bicarbonate, or other effervescent powders, such as those used to treat indigestion.

3. Avoid gulping foods and chew with your mouth closed.

4. Do not allow yourself to become constipated. Constipation can best be managed by careful attention to preventive measures. Good daily dietary habits include an adequate intake of dietary fiber in the form of whole grain breads and cereals, fresh fruits, and vegetables that are raw or cooked until tender crisp. At least 6 to 8 glasses of fluid per day will help add extra fluid to the fiber, thereby increasing stool weight and the softness of stools. Observe good dietary and bowel habits as part of your daily lifestyle. Under special circumstances, preflight meals high in fiber content would be contraindicated, and the flight surgeon may prescribe a high protein, low residue diet, which is discussed later in this pamphlet.

5. If you are bothered by indigestion (heartburn) you may want to avoid excess fat (fried foods, sauces, gravies), caffeine, alcohol, and highly spiced foods.

6. Avoid gas-forming foods. While individual crew members will have differences in food tolerances, the following are possible gas-formers and should be avoided:

Fruits

Avocado
Melons
Raw apples

Vegetables

Beans (especially soybeans)
Broccoli
Brussels sprouts
Cabbage
Cauliflower
Corn
Cucumbers
Green peppers
Lentils
Onions (including leeks, scallions, shallots)
Pimentos
Radishes
Rutabagas
Sauerkraut
Turnips

Meats

Soy-extended ground beef and beef patties*

Breads and Cereals

Doughy Breads (heavy, not completely baked)
Bran cereals and breads

Dehydration

Dehydration can result in decreased coordination, narrowed span of attention, and acceptance of lower standards of performance. During periods of intense stress, thirst is not an adequate indicator of liquid requirements. Water losses need to be corrected by drinking fluids, such as water and juices, at frequent intervals. The following discussion on caffeine suggests why an excessive intake of coffee and tea should be avoided.

Caffeine

Caffeine is a tasteless substance that is found in a number of plants. It comes from the coffee bean, tea leaf, kola nut, and cocoa bean, and is found in coffee, tea, cocoa, chocolate, colas, and soft drinks. It is a stimulant that can cause an increase in heart rate. It can make you restless, nervous, or anxious, and can give you trouble in sleeping. If you consume caffeine-containing products on a regular basis, you should be aware of these side effects and avoid an excessive intake.

See the list below for the approximate caffeine content of common foods.

Product	Caffeine Milligram (mg.)
Coffee, 5 oz.	115
Brewed, drip method	80
Brewed, percolator	80
Instant	65
Decaffeinated, brewed	3
Decaffeinated, instant	2
Tea (5 oz.)	
Brewed, major US brands	40
Brewed, imported brands	60
Instant	30
Iced (12-oz. glass)	70
Cocoa beverage (5 oz.)	4
Chocolate milk beverage (8 oz.)	5
Milk chocolate (1 oz.)	6
Dark chocolate, semisweet (1 oz.)	20
Baker's chocolate (1 oz.)	26

*Soy protein has been added to ground beef to reduce food cost. However, increased flatulence may be associated with soy-extended products. Therefore, avoid all ground beef entrees containing soy protein and those of unknown composition. Alert dining facilities will continue to serve 100 percent ground beef.

Caffeine Content of Soft Drinks

Brand	Caffeine (mg.) (12 oz. serving)
Mountain Dew	54
Mello Yellow	53
TAB	47
Coca-Cola	46
Diet Coke	46
Shasta Cola	44
Shasta Cherry Cola	44
Shasta Diet Cola	44
Mr. PIBB	41
Sugar-Free Mr. PIBB	59
Dr. Pepper	40
Sugar-Free Dr Pepper	40
Big Red	38
Sugar-Free Big Red	38
Pepsi-Cola	38
Diet Pepsi	36
Pepsi Light	36
RC Cola	36
Diet Rite	36
Canada Dry Jamaica Cola	30

Alcohol

Because alcohol is rapidly absorbed from the stomach directly into the bloodstream, its depressant effects are quickly felt. Alcohol interferes with the ability of the brain to use oxygen. Its effects, therefore, are greatly multiplied by altitude. Two drinks on the ground are equal to three or four at altitude. Also, effects of drinking may be compounded if you are fatigued, hungry, or under stress.

The after effects of alcohol, called the "hangover," may be just as dangerous as being intoxicated. Effects of overindulgence of alcohol include headache, dry mouth, mild depression, drowsiness, weakness, fatigue, low blood sugar, impaired nutrient absorption, and intestinal discomfort. Any of these effects may render the aircrew member more susceptible to flight stresses.

The treatment of a hangover requires replacement of body fluids, adequate food intake, and additional sleep. You must also allow an adequate lapse of time between overindulging and resuming flying duties. At least 24 hours is recommended if you have ingested more than 4 ounces of alcohol. Alcoholic beverages offer little nutritional value other than calories. So if you are weight conscious, avoid this source of "empty calories."

If you drink alcoholic beverages, follow these common sense rules:

- Drink moderately and never with the idea of deliberately getting drunk.
- Always dilute spirits with a mixer.
- Never drink on an empty stomach.
- Never gulp an alcoholic beverage.
- Measure liquor carefully.
- Find substitutes for alcohol. At the club, drink club soda with a twist, drink mixes without alcohol, such as Bloody Mary mix, sparkling water, or fruit juices.

Quinine

Quinine is a drug used primarily for its medicinal purposes. In large amounts, it can be fatal. However, even when quinine is prescribed in much lower doses, toxic symptoms are said to occur frequently. These symptoms often include ringing in the ears, nausea, headache, visual disturbances, loss of hearing, and vertigo. Some individuals develop symptoms after only a single dose, or with small repeated doses.

A common source of quinine for the aircrew member is tonic water. While it would require about 7 liters of tonic water taken 3 times a day to produce those toxic symptoms listed above, laboratory studies have shown that very small amounts of quinine can affect those equilibrium functions of the inner ear, causing disorientation. For this reason, the US Air Force Surgeon General warned that tonic water use in more than moderation may increase susceptibility to spatial disorientation or impair recovery from disorientation.

Licorice

Licorice, extracted from natural sources, contains a substance called glycyrrhizic acid that, when consumed in excessive amounts, has caused potassium depletion, with resultant muscle disease and has also been associated with sodium and water retention, the aggravation of hypertension, abnormal sensations, such as burning or prickling, and changes in body chemistry. An excessive intake could also counteract the effect of medications for hypertension.

Licorice is a flavoring ingredient in candy, alcoholic beverages, and drugs. Most American manufacturers use a synthetic licorice flavor in making various candies. However, many imported varieties of licorice candies, especially those from Italy, France, Holland, and Switzerland, contain the natural extract. Excessive consumption of such imported candies may be contraindicated in patients with chronic cardiovascular disease who take nonpotassium-sparing diuretics, or who are on sodium restricted diets.

Aircrew members who regularly consume licorice-flavored candy, alcoholic beverages, or over-the-counter drugs, should seek the advice of the flight surgeon as to the possibility of adverse effects.

Vitamins and Minerals

Vitamins and minerals are essential nutrients that regulate body processes. They are also components of body tissues.

The accepted guide for the intake of vitamins, minerals, and other nutrients is the recommended dietary allowances (RDA). These allowances are the levels of intake of essential nutrients, determined by the Food and Nutrition Board of the National Academy of Sciences, to be adequate to meet the known nutritional needs of practically all healthy people. These recommendations, which are based on available scientific knowledge, also have a built-in safety factor.

If vitamins and minerals are added to a food so that a single serving contains 150 percent or more of the RDA for any one of the vitamins or minerals, the food is classified as a drug and is subject to drug regulations rather than food regulations. The FDA established this labeling law to assist and protect the consumer. Why is this important? Too many people still believe that if small amounts of a vitamin are necessary to maintain the body, then larger amounts are even better for your health.

Supplements are rarely necessary for the individual who eats a wide variety of foods, using the basic four food groups as a guide. Exceptions include certain disease states and other demanding phases of the life cycle (infancy, pregnancy, and the elderly), when the physician may prescribe or recommend the use of specific preparations.

About 40 different nutrients have been identified as being necessary to nutritional health. Each of these must be in proper proportion since too much or too little of one nutrient tends to alter the function and behavior of others. A serious imbalance can occur through careless self-dosage of vitamins and minerals. Learn the facts about vitamin and mineral supplements before using them.

Food Safety

Foodborne Illnesses

Food can be made unsuitable for human consumption by spoilage or contamination, due to chemicals and living microorganisms.

Bacteria and Viruses

Bacteria and viruses are all about us—in the air, on working surfaces—everywhere. Some grow in food producing poisons that, when ingested with the food, make people ill. Even though bacteria may be killed by heating, the poison remains. Other organisms are consumed with food and continue to grow in the human body causing disease. Thus, foodborne illness may be due to bacterial growth in food and the corresponding production of poisons, or the transmission of disease causing organisms, such as bacteria, viruses, or parasites, from the food source to the individual.

Organisms causing scarlet fever, hepatitis, tuberculosis, typhoid fever, amoebic dysentery, shigellosis, and trichinosis can be transmitted by food, to later multiply and cause the disease. Other illnesses, such as botulism and acute gastroenteritis, are caused by toxins (or poisons), produced by the growth of *Clostridium botulinum*, and *Staphylococcus aureus*, respectively, within certain types of foods. *Clostridium botulinum* produces an extremely potent toxin that causes paralysis of muscles and nerves, and when ingested in sufficient quantities, may cause death. *Staphylococcus aureus* produces a toxin that makes one ill 2 to 4 hours after consuming it. The most common infectious organisms known for foodborne transmission are *Salmonella* and *Shigella*. Illness caused by these organisms may result in vomiting, cramps, headache, fever, and diarrhea in only a few hours.

Other foodborne organisms that cause disease in humans are parasites, such as *Entamoeba histolytica*, *Trichinella spirillis*, and several other species of tapeworms, roundworms, and ameoba. *Entamoeba histolytica* is found in impure water, in the soil, and on various fruits and vegetables.

Flight kitchens provide meals and beverages that have been prepared by trained food service personnel under sanitary conditions. Once on board the aircraft, however, continued proper storage and preparation of food are very important. Flight meals should be stored and heated according to instructions and eaten within the time period recommended. It is advisable that the aircraft commander and copilot not consume inflight meals within 1½ hours of each other during flight. It is also desirable that these meals consist of different menus.

Food safety is also a matter of individual choice and responsibility. Aircrew members should exercise caution in selecting offbase dining facilities.

Safe food handling practices at home can also do much to prevent foodborne illness. Some basic DO's and DON'T's concerning food safety are:

1. DO keep prepared foods at the right temperature. Cold foods should be kept in the refrigerator at 40 degree Farenheit (°F) or lower until serving. Hot foods should be kept at 140 °F or higher. The danger zone for bacterial growth is between 40 °F and 140 °F.

2. DO put leftovers that are to be used at another meal in the refrigerator. Food should not be allowed to remain on the stove or dinner table any longer than 30 minutes.

3. DO handle picnic food properly in hot weather. Foods such as potato salad, macaroni salad, and meat salad (or foods containing meat, eggs, salad dressing, or mayonnaise) should be made just before serving. Make sure that all ingredients are cold before mixing, and keep the prepared item refrigerated.

4. DON'T leave perishable groceries in car, especially during hot weather. For example, milk left at room temperature for 1 hour spoils in 24 hours.

5. DON'T eat any leftover food that is over 24-hours' old. This is especially true for dangerous food items, such as canned meats, creamed dishes, desserts containing custard, cream filling, or meringue, and foods containing eggs, ground or chopped meat, salad dressing, or mayonnaise.

6. DON'T eat home-prepared or picnic foods that have been left outdoors or at room temperature for over 2 hours.

7. DON'T eat food from a can if the can is swollen or if the ends of the can "flip" inside and outside the rim of the can.

8. DON'T eat raw eggs or foods containing raw eggs.

9. DON'T eat raw pork and pork products that have not been thoroughly cooked to the well-done stage.

Eating in foreign countries can be fun and interesting, but can also result in foodborne illness. If food sources and food handling practices are unknown or questionable, those guidelines listed below will help to reduce the chance of developing the all-too-familiar food-related illnesses. When evaluating these suggestions, keep in mind the technological development of the country. Many of these recommendations apply primarily to underdeveloped countries.

1. Bottled water rather than tap water should be used.

2. Remember that ice or water used in an alcoholic beverage is not purified and should be avoided.

3. Hot coffee and tea are usually safe if the water has been boiled.

4. Bottled beer and soft drinks are usually free from contamination.

5. Milk, cream-filled pastries, cheese, custards, puddings, ice cream, butter, and potato, macaroni, and meat salads (tuna, chicken, egg, etc.) should be avoided.

6. Rare meat or raw fish should be avoided. Meats should be cooked to the well-done stage.

7. Fresh (raw) fruits are usually safe to eat if they can be peeled (bananas, oranges, grapefruit, etc.). Raw vegetables, such as those used in a salad, should be avoided.

8. Food should not be purchased from street vendors.

9. In general, if a food has been thoroughly cooked and is served hot, it is probably safe to eat.

10. An en route stopover or delay may provide you with enough time to try the local fare. If you can't resist the local produce, soaking it 1 or 2 minutes in 1 gallon of water, to which 1 tablespoon of liquid chlorine bleach (for example, Clorox brand) has been added, will sanitize the food item.

11. Aircrews should not eat in the same restaurant. If this is not practical, a different menu selection should be made by each crew member. These suggestions will help reduce the possibility of an entire aircrew contracting foodborne illness and seriously hampering a mission.

Further information about safe food handling practices should be obtained from qualified personnel in base medical facilities and in base food service facilities.

Pre-Flight Meals

The human body in flight is subject to stresses that can be increased by eating improperly before flying. The wrong foods may retard digestion causing abdominal cramps and leading to difficulties with breathing. The right foods and eating habits are essential to efficiency, alertness, and safety.

Ground Rules for Pre-Flight Meals

DO:
- Eat before flying.
- Choose nutritious, easily digested foods.
- Allow plenty of time for meals.
- Eat breakfast.

DON'T:
- Eat bulky, greasy, gaseous, or indigestible foods.
- Drink alcoholic beverages.
- Overeat.
- Omit breakfast.

Several hours before takeoff, you should consume a freshly prepared, balanced meal of fairly small portions. Try to eat slowly and in relaxed surroundings. Remember, this preflight meal should provide sufficient energy to maintain efficiency until your next meal.

Menu Pattern for Pre-Flight Meals*

Breakfast

½ cup fruit or juice
2 oz. meat
1 egg
½ cup cereal, hot or cold
1 slice (sl.) toast
1 teaspoon (tsp.) margarine
1 tsp. jelly
6 oz. milk, low-fat or skim
Coffee, tea, or decaffeinated coffee
2 tsp. sugar
Salt, pepper

Lunch and Dinner

½ cup soup or juice, if desired
4 oz. meat, poultry, fish, or cheese
2 oz. gravy or other accompaniment
½ cup potato or substitute
½ cup vegetable
½ cup salad
1 tbsp. salad dressing
1 sl. bread or substitute
1 tsp. margarine

½ cup dessert, preferably fruit, gelatin, sherbet, etc. (avoid rich desserts)
8 oz. milk, low-fat or skim
Coffee, tea, or decaffeinated coffee
1 tsp. sugar
Salt, pepper

*Sample menu pattern supplies about 2200 calories. Caloric level will vary according to food selections and amount consumed.

Sample Menu for Pre-Flight Meals**

Breakfast

½ cup orange juice
2 oz. lean broiled ham
1 poached egg
1 sl. toast
1 tsp. margarine
1 tsp. grape jelly
8 oz. low-fat milk
Coffee, tea, or decaffeinated coffee
2 tsp. sugar
Salt, pepper

Lunch

½ cup chicken noodle soup
4 oz. broiled hamburger on a bun with lettuce and tomato
Choice of catsup, mustard, and mayonnaise
½ cup fresh fruit salad
½ cup sherbet
Coffee, tea, or decaffeinated coffee
1 tsp. sugar
Salt, pepper

Dinner

4 oz. broiled chicken
½ cup rice with 2 oz. chicken gravy
½ cup green beans
½ cup tossed green salad with 1 tbsp. french dressing
1 small dinner roll
1 tsp. margarine
½ cup canned peaches
8 oz. low-fat milk
Coffee, tea, or decaffeinated coffee
1 tsp. sugar
Salt, pepper

**See page 13 for a list of foods to avoid.

In-Flight Meals

The human body needs refueling inflight to maintain efficiency, alertness, and power of concentration. Long periods without eating and insufficient fluids can cause unnecessary fatigue, slower reactions, inability to concentrate and, in extreme cases, blurred vision.

Meals prepared by the flight kitchen are done so as prescribed by AFR 146-15, Flight Feeding. Listed below are the meals most often provided. Those on a weight control or reduction program should review the lower caloric meals that are available.

Flight Meals for Routine Use

Sandwich Meal, Lower Caloric Sandwich Meal

Purpose: Provide breakfast, lunch, or dinner meal. Limited to a flight requiring one meal or the first meal on a long flight.

Breakfast

Components: Regular	Lower Caloric
Juice *or* fruit	Unsweetened fruit *or* vegetable juice
Milk	Nonfat milk
Cereal *or* eggs	Nonsugar-coated cereal, *or* egg, *or* lowfat yogurt
Cheese *or* peanuts	Peanuts
Sweet roll *or* bread	Bread
Margarine (2)	Fresh fruit *or* gelatin
Jelly *or* peanut butter	Margarine (1)
Sugar	Sugar substitute
Cream	Coffee or tea
Coffee or tea	

Lunch and Dinner

Regular	Lower Caloric
Juice	Unsweetened juice
Milk	Nonfat milk
Sandwich	½ sandwich
Chicken breast	Chicken breast
Potato chips, *or* relishes, *or* dried fruit	Relishes *or* salad
Dessert *or* fruit	Fresh fruit
Condiments	Condiments
Sugar	Sugar substitute
Cream	Coffee or tea
Coffee or tea	

Meal, Flight, Cooked Frozen

Purpose: Provide hot breakfast, lunch, or dinner to crew members and passengers on flights aboard transport aircraft equipped with an operational warming oven.

Components: **Regular**

Frozen meal, plus supplements such as:
- Salad *or* relishes
- Dinner roll, *or* quick bread, *or* sweet roll, *or* bread with butter
- Dessert *or* fruit
- Milk *or* juice
- Condiments
- Cream, sugar
- Coffee or tea

Lower Calorie

Frozen meal, plus supplements such as:
- Salad *or* relishes
- Bread with butter
- Nonfat milk or unsweetened juice
- Condiments
- Sugar substitute
- Coffee or tea

High-Protein, Low-Residue Diet

As explained in AFR 146-15, a high-protein, low-residue diet is used to reduce the amount of fecal matter in the large intestine, to help control bowel irritability, and to help prevent expansion of intestinal gas. It is recommended before jet aircraft flights of 6 hours or longer under these circumstances:

1. If the flight requires the use of pressure suits.
2. When there are space restrictions or lack of equipment for preparation of in-flight meals.
3. When there are no facilities available for the elimination of body waste.

Continue the diet if the flight is to be resumed within 24 hours.

Allowed	Avoid
Beverages. All. Milk is limited to 8 oz. per day to minimize residue.	More than 8 oz. of milk per day.
Bread. White (toasted or plain), french or italian bread; soda crackers, melba toast.	Bread or crackers containing whole grain or bran; quick breads, such as biscuits, coffeecake, and doughnuts; french toast, pancakes, popovers, waffles.
Cereals. Cream of rice, cream of wheat, grits, farina.	Cereals containing whole grain or bran.
Cheese. Cottage cheese.	All others.
Potato or Substitute. White potatoes boiled or baked without skin; noodles, macaroni, white rice.	All others.
Desserts. Gelatin, sherbet, angel food cake, sponge cake, sugar cookies, popsicles.	All others.
Meat or Substitute. Broiled, roasted, boiled or grilled without excess fat—lean, tender beef, liver, pork, or veal; canned lean ham; chicken or turkey without gristle; fish. Smooth peanut butter.	Tough cuts of meat or meat with excessive marbling; corned beef, luncheon meat, sausage, frankfurters; fried or smoked fish, meat, or poultry; chunky peanut butter.
Sweets. Sugar, jelly, honey, and syrup in limited amounts.	Sugars and sweets in excess; jams or preserves containing seeds or skin.

Allowed	Avoid
Vegetables. Tomato juice, vegetable juice.	All others.
Miscellaneous. Salt.	All herbs and spices; barbecue, chili, soy, and steak sauces; catsup, mustard, coconut, nuts, garlic, horseradish, olives, pickles, relishes, pepper, popcorn, pretzels.
Eggs. Soft or hard cooked, scrambled without fat, poached.	Fried eggs.
Fat. Butter or margarine, not to exceed 2 teaspoons per day; cream substitute.	Fat in excess of 2 teaspoons per day.
Fruit. Strained fruit juices. Ripe bananas, canned, peeled peaches or pears in limited amounts.	Fruits, except those allowed; apple juice.

Menu Pattern for High-Protein, Low-Residue Meals

Breakfast	Lunch	Dinner
Fruit or juice	Meat or substitute	Meat or substitute
Cereal	Vegetable juice	Potato or substitute
Meat or substitute	Bread	Vegetable juice
Eggs	Crackers	Bread
Toast	Margarine	Fruit or dessert
Jelly	Fruit or dessert	Coffee or tea
8 oz. milk	Coffee or tea	Dry cream substitute
Coffee or tea	Dry cream substitute	Sugar, salt
Dry cream substitute	Sugar, salt	
Sugar, salt		

Sample Menu for High-Protein, Low-Residue Meals

Breakfast

4 oz. strained orange juice
1/2 cup cream of wheat
6 oz. grilled, trimmed ham steak
1 poached egg
2 sl. white toast
Grape jelly
8 oz. milk
Coffee or tea
Dry cream substitute
Sugar, salt

Lunch

Sandwich:
6 oz. roast beef
2 sl. white bread
with 1 pat margarine
4 oz. tomato juice
Cherry gelatin
Coffee or tea
Dry cream substitute
Sugar, salt

Dinner

8 oz. broiled or baked chicken
4 oz. vegetable juice cocktail
Medium baked potato (without skin)
1 sl. white bread
1 pat margarine
2 canned pear halves
Coffee or tea
Dry cream substitute
Sugar, salt

Vending Machine Snacks

Vending machine snacks, such as a candy bar or potato chips, provide little in the way of nutrients and, therefore, are a source of empty calories. However, not all vended food items are nutritionally unsound. Examples of nutritious snacks that can be found in vending machines include: cheese and crackers, peanut butter crackers, fruit or vegetable juice, milk, canned fruit, sandwiches, canned soups and stews, and puddings.

Post-Flight Meals

When several time zones have been traversed, it may be best to consume the meal common for the area, in order to aid adjustment. If greatly fatigued, eat lightly, rest or sleep, and have a full meal later. If you are unable to ingest a complete meal, recommendations for refreshments after flight include: fruit, juices, and milk and milk products such as ice cream, yogurt, and cheese with crackers.

Between Meal Snacks

As a flight crew member, you may require additional energy in the form of a snack during or between flights. The snack meal is available in the Air Force flight feeding system. The components of the regular and lower caloric snack meals are listed below.

Snack Meal

Purpose: Used on short flights not requiring full meal service or on long flights besides the flight meal. Sold to authorized passengers and crew members. Are not issued in place of a regular flight meal.

Components:

Regular

Juice *or* milk
Sandwich *or* chicken with roll
Butter
Condiments
Cream substitute, sugar
Coffee or tea

Lower Caloric

Unsweetened juice *or* nonfat milk
½ sandwich *or* chicken with roll
Butter

Condiments

Sugar substitute
Coffee or tea

Alert Facility Feeding

Alert aircrew members are subject to those unnatural stresses caused by high altitudes, high-speed flights, and long periods of constant readiness. Such stresses can bring about fatigue, poor digestion, emotional strain, and physical illness. Proper diet helps to prevent these problems and to check the tendency of aircrew members to gain weight because of the sedentary nature of combat alert duty. Those types of meals that are available in alert facilities are:

Alert Aircrew Facility*

Purpose: Provide three freshly prepared meals per day for personnel designated to staff and support combat-ready aircraft.

Components:

Breakfast

Regular	Lower Caloric
Fruit or juice	Fruit or juice
Cereal with sugar	Cereal with sugar substitute
Milk, nonfat	Milk, nonfat
Eggs	2 eggs (prepared without fat)
Bacon	
Toast	1 sl. toast
Butter	1 pat butter
Jelly or jam	
Sugar and milk (for coffee)	Coffee, black

Lunch and Dinner

Regular	Lower Caloric
Meat or fish	3 oz. lean meat or fish
Potato or substitute**	Potato or substitute**
Vegetable	Vegetable
Salad with dressing	Salad (without dressing)
Bread	1 sl. bread
Butter	1 pat butter
Dessert	Fruit (lunch)
Sugar	Dessert (dinner only)
Milk	Coffee, black
	Milk, nonfat

* If there is no food service capability within the combat alert facility, the meal, flight, cooked frozen and lower caloric sandwich meals are authorized. The guide to be used for alert facility feeding is AFP 146-17, United States Air Force Worldwide Menu, with revisions made to meet the specific dietary requirements for aircrews.

** Includes butter used in cooking.

Sensible Limited Intake Menu (SLIM)

The SLIM diet is a calorie restricted meal plan that is available to crew members who wish to control their caloric intake. The menu pattern consists of about 1500 calories per day and is based on the information in AFP 146-17, and recommendations stated in the Dietary Goals for the United States, prepared by the Senate Select Committee on Nutrition. The meal plan is as follows:

Breakfast	Lunch	Dinner
Fruit or fruit juice (1)	Plain meat (3 oz.)	Plain meat (3 oz.)
Fat restricted egg (1)	Plain potato or substitute	Plain potato or substitute
Toast or cereal (1)	Plain vegetable	Plain vegetable
Margarine (1)	Vegetable salad	Vegetable salad
Nonfat milk (8 oz.)	Calorie restricted salad dressing	Calorie restricted salad dressing
Coffee or tea	Bread or roll (1)	Bread or roll (1)
	Margarine (1)	Margarine (1)
	Fruit (1)	Fruit (1)
	Coffee or tea	Nonfat milk (8 oz.)
		Coffee or tea

Some menu modifications that will help you in following this meal plan are listed below:

(1) Small to medium portions, about 3 oz. of roast or grilled meat, fish, or fowl; served without gravy or fat upon request.

(2) At least one potato or substitute prepared without butter, cream sauce, or fat.

(3) At least one vegetable cooked without butter, cream sauce, fat, or bacon.

(4) Salad made of low calorie vegetables and served with low calorie dressings or lemon wedges.

(5) Fresh or canned fruit.

(6) Nonfat milk or buttermilk.

When these items are not clearly visible, feel free to inquire about them to personnel serving you.

Checklist

Use this flight checklist as your Guide to Good Eating:

YES NO

___ ___ **Do I select a variety of foods from the basic four food groups daily?**

___ ___ **Do I follow the recommendations made for preflight, inflight, and postflight meals?**

___ ___ **Do I choose between meal snacks wisely?**

___ ___ **Do I maintain my ideal body weight?**

___ ___ **Do I avoid food fads and fallacies?**

___ ___ **Do I use alcohol and caffeinated beverages in moderation?**

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Suggested Reading

These Air Force publications are available for additional information on nutrition:

AFP 166-9, Know What You're Eating—A Key to Health
AFR 146-15, Flight Feeding
AFP 166-27, Behavior Modification Related to Food

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

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